(19) JAPAN PATENT BUREAU (JP)(11) Publication No.: Showa 54-133766

(12) OFFICIAL GAZETTE LAID-OPEN PATENT (A)

(43) Date of laying open: October 17, 1979

(51) Int. Cl.[2]	I.D. Code	(52) Japan Class.	Intraoffice No.
H –5 B 37/01		93 A 1	7254-3K

Lay open: October 17, 1979

Number of inventions: 1
Request for example: none

(Total of 3 pages)

(54) Title: VARIABLE-BRIGHTNESS LIGHTING SYSTEM FOR A LIGHTING INSTRUMENT

(21) Application No.: Showa 53-41246

(22) Date of Application: 4/10/1978

(71) Applicant:
ICHIKOH IND. K.K.
1018, 5-Chome, Himachi-Gotanda,
Shinagawa-ku, Tokyo-to

(74) Agent:
M. AKIMOTO, Patent Agent

(72) Inventor:
K. SAITO
1030-5 Oaza-Shirooka, Shirooka-cho,
Saitama-gun, Saitama-ken

SPECIFICATION

Title of the invention:

Variable-brightness lighting system for a lighting instrument

Patent Claim

Variable-brightness lighting system for a lighting instrument, for a vehicular lighting instrument having multiple batteries connected in series and at least one light that uses the said batteries as its electrical source, in which a separate voltage terminal is provided at least one place between the said battery of the said multiple batteries, and the entire voltage terminal and the said separate voltage terminal are made suitably using a switch so as to make the brightness of the light variable.

Detailed explanation of the invention

The invention relates to a variable-brightness lighting system for a lighting instrument, and especially to that which uses a battery as the electrical source.

Conventionally, there are many systems that change the brightness of vehicular lights or signal lights, that use a battery as their electrical source, but all of these systems have had problems during practical application.

First of all, in the widely used resistance system, a resistance is inserted between the lighting instrument and the battery and the electrical current is controlled by the resistance for changing the brightness. However, in this system, a large amount of electricity is consumed, with waste, and the system is large in size, requiring a large space.

Next, the semiconductor system uses a transistor or SCR, etc., and the DC of the battery is converted to AC and the effective current of the AC is changed to make the brightness variable. However, this system is costly and has low reliability.

In the filter system, transmittance of the lens of the lighting instrument, not electrical current, is changed for variable brightness, but the mechanism is complex, large and costly.

In the double-filament system, the filament of each light of the lighting instrument is made double and the filaments are switched for variable brightness. However, with this system, a part of the filament needs to be doubled for the light to produce a double filament, which is difficult in practice. Especially, there are already many examples of use of a double filament, such as a main and dimmer filament of a vehicular headlight, double filament for switching between the stoplight and taillight of a vehicular rear combination light, etc., therefore, additional use of the double filament system is impossible in practice.

To address the above situation, this invention offers a variable-brightness lighting system for a lighting instrument of high reliability, which can be applied to the conventional double filament, can be used for general purposes and does not require high consumption of electricity as the resistance system does, is of small size, has a simple mechanism and is of low cost.

An example of this invention is explained below with the aid of figures.

Figure 1 shows the application of this invention to an automobile headlight. During low-speed driving, the brightness of the light is decreased in such a headlight to prevent glare for the driver of the preceding car. The present system can achieve such decrease of brightness.

In Figure 1, 1R, 1L are the right headlight and left headlight, respectively, and M and D are the main filament and the dimmer filament. That is, in this example, each headlight has a double filament and further doubling of the filament to achieve variable brightness is impossible in practice. Incidentally, dimmer filament D is for illuminating the front with lower brightness than that of main filament M.

Two batteries, V_1, V_2, are the sources of electricity for headlights 1R, 1L. These batteries are connected in series when the negative end of V_1 is used for grounding and the positive end of V_2 is connected to lighting switch SW_1 for turning headlights 1R and 1 L ON and OFF. This switch, SW_1, is closed for normal ON of headlights 1R, 1L and the main/dimmer switching switch SW_2 is used to energize main filament M or dimmer filament D. Under the conditions illustrated, switch SW_2 is switched to terminal d for lighting of the dimmer filament and not to the main-side terminal m.

In this invention, a separate voltage terminal t is provided between batteries V_1, V_2 to further decrease the brightness. Brightness-changing switch SW_1, which has high-voltage terminal h and low-voltage terminal l, varies the brightness via said separate voltage terminal t and switch SW_1, that is linked with lighting switch SW_2. Under the illustrated conditions, switch SW_1 is switched to high-voltage terminal h so that dimmer filament D is turned ON by the sum of the voltages of both batteries V_1 and V_2. When brightness changing switch SW_2 is switched from such a condition to low-voltage terminal l, current from the positive end of battery V_1 only runs to dimmer filament D and current from battery V_2 does not contribute, so that the light is turned ON by voltage of battery V_1 only. Therefore, headlights 1R, 1L are darker than dimmer brightness.

Figure 2 shows another example of this invention, the application of this invention to an automobile combination light. In the figure, 2R, 2L are the right and left tail/stoplights. 3R, 3L, 4R, 4L are the front right, front left, rear right and rear left turn signal lights, respectively. This invention is applied in order to decrease the brightness of such a signal light because sometimes these lights are required to prevent glare.

In this example, tail/stoplights 2R and 2L are the double filament-type with taillight filament T and stoplight filament S, and, similarly to the headlight of Figure 1, further doubling of these lights is impossible in practice.

Similarly to the Figure 1 example, two batteries connected in series, V_1, V_2, are the electrical source in this example and a separate voltage terminal t is provided between batteries V_1 and V_2. This terminal t is connected to low-voltage terminal l, which is one of the brightness-changing switches, SW_4. On the other hand, high-voltage terminal h of switch SW_4 is connected to the positive end of battery V_2.

Therefore, normally, switch SW_4 is switched to high-voltage terminal h for turning ON the signal lights. That is, switch $SW_{5[?\ hard\ to\ read]}$ for the taillight is closed to energize filament T for the taillight of tail/stoplights 2R and 2L, or switch SW6 is closed to energize filament S for the stoplight of tail/stoplights 2R, 2L, or, when needed, direction-indicating switch SW_7 is used to turn ON one of the right side turn signal lights 3R, 4R or left side turn signal lights 3L, 4L. Under these conditions, the signal lights receive the sum of the voltages of both batteries V_1, V_2 so that the light illuminates brightly.

To decrease the brightness under these conditions, switching of the brightness-changing switch SW_4 to low-voltage terminal l suffices. Then the electric current from battery V_1 only runs to the signal light, so that the brightness is decreased (incidentally, in Figure 3, F is a flasher [sic] unit).

In the above examples, 2 batteries or one of those is used as the source of electricity. For example, as shown in Figure 3, 6V and 12V batteries can be switched to be used as the electric source. Also, as shown in Figure 4, 3 batteries, V_1, V_2, V_3 can be used with separate voltage terminals t_1, t_2 for 3-step switching. In the example of Figure 3, 3 types of batteries, 4V, 6V and 12V, can be used, as desired.

As shown above, the variable-brightness lighting system for a lighting instrument of this invention has at least one separate voltage terminal between multiple batteries for a vehicular lighting instrument that has multiple batteries connected in series and at least one light that uses the said multiple batteries as its electrical source, for switching across the entire voltage terminal and separate voltage terminals via a switch, and thereby the brightness of the light is made variable. Therefore, the invention can be applied to a conventional system by merely adding the switch for switching to the separate voltage terminals and the mechanism for changing the brightness changing is very simple. Even if the brightness is switched to lower brightness, electricity is not consumed wastefully, unlike in the resistance system, in order to conserve energy. Its reliability is extremely high and its size and cost can be reduced.

Incidentally, needless to say, this invention is not limited to the above examples.

Brief explanation of the figures

Figure 1 is a circuit diagram of the first practical example of this invention. Figure 2 is a circuit diagram of a second practical example of the same and Figures 3 and 4 are examples of the electrical sources that can be used in the above examples.

V_1, V_2, V_3 are batteries, 1R, 1L, 2R, 2L, 3R, 3L, 4R, 4L are lights, t_1, t_2, t_3 are separate voltage terminals, $SW_{[2?\ illegible]}$, SW_4 are switches (brightness-changing switches).

Applicant: ICHIKOH KOGYO K.K. **Agent:** M. AKIMOTO, Patent Agent

Figure 1

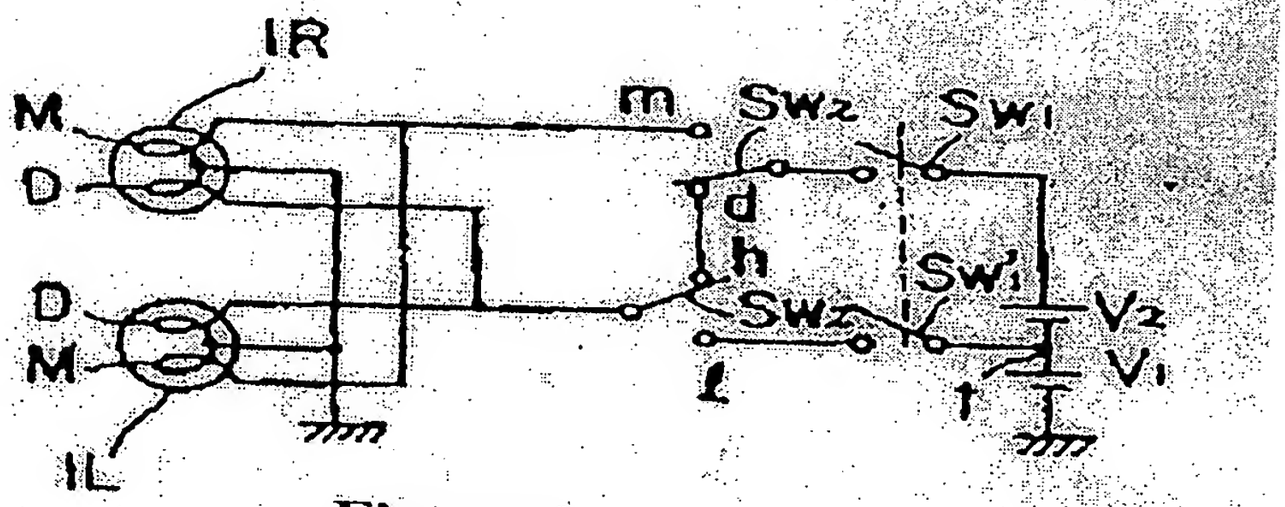

Figure 2

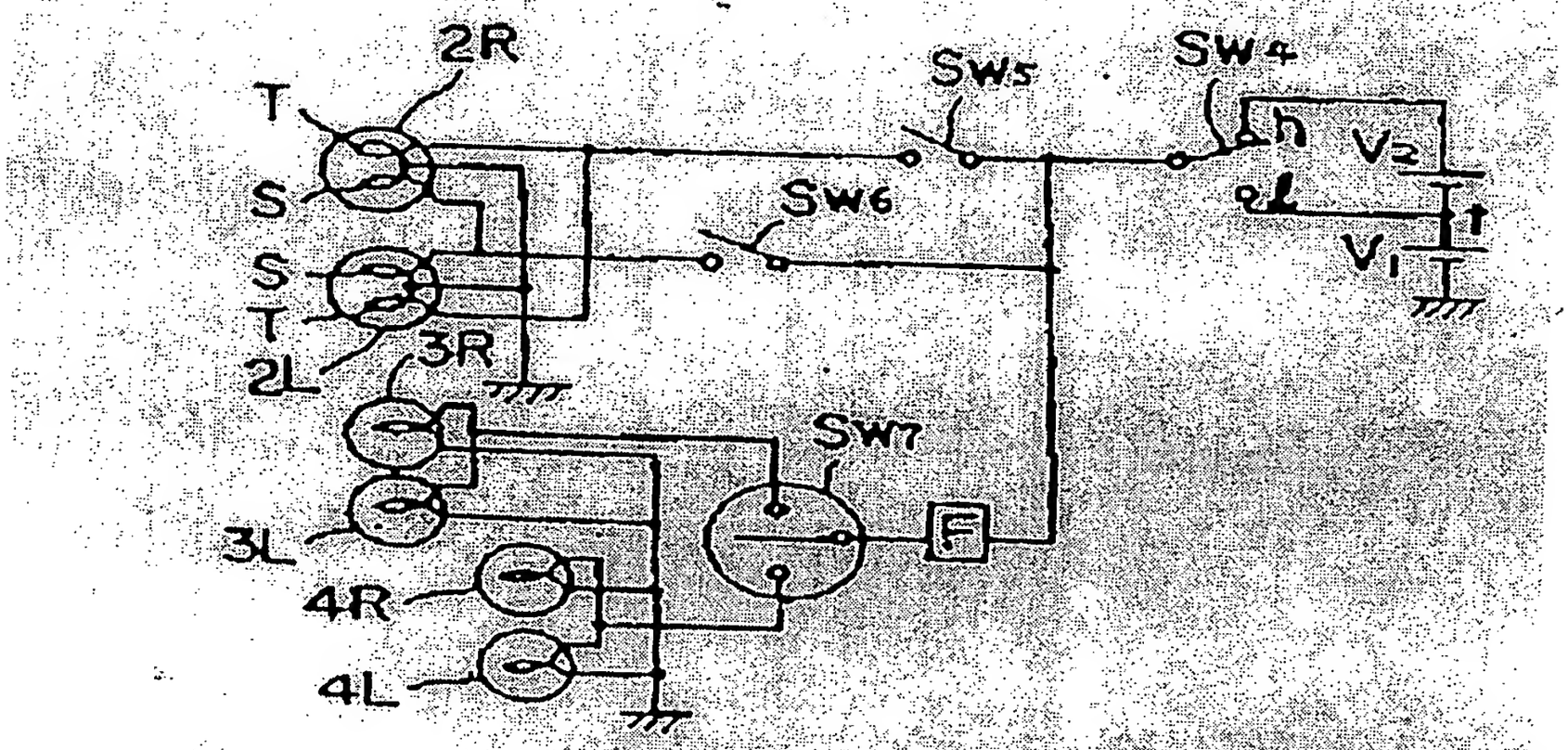

Figure 3

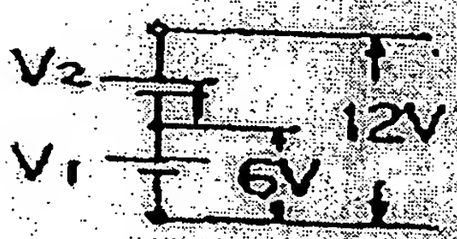

Figure 4